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10/613,328	07/02/2003	Michael V. Paukshto	071174	4295

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EXAMINER	
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ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/613,328	PAUKSHTO ET AL.	
	Examiner	Art Unit	
	(Nancy) Thanh-Nhan P. Nguyen	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/28/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 1-5 and 7-23 are objected to because of the following informalities:

Claims 1-5 and 7-23 currently read as, "method of using". It appears it should have read as, "method of making" since the claims further define "the method comprising the step of setting..."

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-9, 12-14, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al "Two Novel Applications of Thin-Film E-Type Polarizers" in view of Ignatov et al "Thin Crystal Film Polarizers and Retarders", and further in view of Suzuki (US 2002/0089621).

Regarding claims 1, 2 and 22, Paukshto et al discloses a method of making a liquid crystal display comprising: a front panel comprising a front alignment layer having an alignment direction; a rear panel comprising a rear alignment layer having an alignment direction; and a liquid crystal layer between the front and rear alignment layers, wherein the front and rear panels further comprises a front and rear polarizers,

said polarizer comprised of a thin crystal film; wherein the liquid crystal layer has a rotational twist angle of about 90°, a pre-tilt angle of not more than 2 °, [col. 2, lines 3-13].

Paukshto et al lacks disclosure of the polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is 3.4 +/- 0.3A. However, this interplanar distance is common for aromatic compounds in crystal and aggregates, as evidenced by Ignatov et al, ["X-Ray Study of TCF" – 3rd par.], for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability, [Abstract & Introduction, 2nd par.]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have E-type polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is 3.4 +/- 0.3A for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability.

Further, even though Paukshto lacks disclosure of the method of making a liquid crystal display comprising of setting the direction of liquid crystal directors coinciding with an off-normal viewing direction of liquid crystal display at the mid-point of the rotational twist when a voltage is applied to the liquid crystal layer by selecting the alignment, material and thickness of the liquid crystal layer whereby a maximum image contrast is achieved in the off-normal viewing direction, wherein the direction of the

liquid crystal directors coincides with the off-normal viewing direction is in the range of 15° to 35° in azimuth angle in the voltage-on state and the contrast ratio becomes the largest in such a direction, more specifically, the maximum contrast ratio is not lower than 40, Paukshto's device would have achieved these features since the reference by Paukshto has met the structure of the invention. Furthermore, the result of having direction of liquid crystal directors coinciding with an off-normal viewing direction of the liquid crystal display at the mid-point of the rotational twist when a voltage applied to the liquid crystal to achieve a maximum image contrast in the off-normal viewing direction would be inherently in twisted nematic liquid crystal display device.

Regarding claim 5, Paukshto et al discloses at least one of front and rear polarizers is E-type polarizer, [col. 2, lines 3-13]; Paukshto et al lacks disclosure of the transmission axis of the E-type polarizer and the alignment direction of the alignment layer in the same panel as the E-type polarizer are perpendicular.

Suzuki teaches the transmission axis of E-type polarizer and the alignment direction of the alignment layer in the same panel as the E-type polarizer are perpendicular, [par. 0020], for the benefit of having high contrast in liquid crystal display, [par. 0027].

Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the transmission axis of E-type polarizer and the alignment direction of the alignment layer in the same panel as the E-type polarizer are perpendicular for the benefit of having high contrast in liquid crystal display.

Regarding claim 23, Paukshto et al lacks disclosure of the E-type polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is 3.4 +/- 0.3A. However, this interplanar distance is common for aromatic compounds in crystal and aggregates, as evidenced by Ignatov et al, ["X-Ray Study of TCF" – 3rd par.], for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability, [Abstract & Introduction, 2nd par.]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have E-type polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is 3.4 +/- 0.3A for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability.

Regarding claims 7-9, Paukshto et al lacks disclosure of wherein at least one of the aromatic organic compounds contains heterocycles; the thin crystal film is formed from a lyotropic liquid crystal based on at least one dichroic dye; wherein the thin crystal film is treated with ions of bi-or/and trivalent metals.

However, it was conventional at the time to have at least one of the aromatic organic compounds contains heterocycles; the thin crystal film is formed from a lyotropic liquid crystal based on at least one dichroic dye; wherein the thin crystal film is treated with ions of bi-or/and trivalent metals for the benefit of achieving high temperature and environmental stability, as evidenced by Iganatov et al, ["Introduction" – 1st and 2nd

pars.; "Materials and Method" – 1st & 2nd pars.] Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have at least one of the aromatic organic compounds contains heterocycles; the thin crystal film is formed from a lyotropic liquid crystal based on at least one dichroic dye; wherein the thin crystal film is treated with ions of bi-or/and trivalent metals for the benefit of achieving high temperature and environmental stability, as evidenced by Iganatov et al.

Regarding claim 14, Paukshto et al discloses at least one of the front and rear polarizers is an internal polarizer, [col. 2, lines 3-13].

Regarding claims 3-4, Paukshto et al lacks disclosure of the transmission axes of the front and rear polarizers are perpendicular; or the transmission axes of the front and rear polarizers are parallel.

It was well known that placing the polarizers so that the transmission axes of the front and rear polarizers are perpendicular or parallel to each other to have liquid crystal display operating in normal white mode or normal black mode, as evidenced by Suzuki, [see figure 8, and paragraph 0009]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to place the polarizers wherein the transmission axes of the front and rear polarizes are perpendicular or parallel to each other for the purpose of having liquid crystal display operating in normal white mode or normal black mode.

Regarding claim 12, Paukshto et al lacks of disclosing the transmission axis of the front polarizer and the alignment direction of the front alignment layer formed an angle at 90 degree.

Suzuki discloses the transmission axis of the front polarizer and the alignment direction of the front alignment layer formed an angle at 90 degree, [par. 0020].

Regarding claim 13, Paukshto et al lacks of disclosing the transmission axis of the rear polarizer and the alignment direction of the rear alignment layer form an angle at 0 degree.

Suzuki discloses the transmission axis of the rear polarizer and the alignment direction of the rear alignment layer form an angle at 0 degree, [par. 0020].

The above listed features of claims 12-13 are described in Suzuki's disclosure as being for the benefit of having high contrast in liquid crystal display, [see paragraph 0027]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use O-type / E-type polarizers, and arrange the transmission axes of the polarizers and the alignment direction of the alignment layers in certain ways, as described above, for the benefit of having high contrast in liquid crystal display.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al, and further in view of Kurtz et al (US 2005/0151905).

Regarding claim 10, Paukshto et al lacks disclosure of the front and rear polarizers are O-type polarizers.

It was well known to use O-type polarizers for the benefit of being available, and having high transmission of light during open state, as evidenced by Kurtz et al, [par. 0065]. Therefore, at the time the invention was made, it would have been obvious to a

person of ordinary skill in the art to use O-type polarizers for the benefit of being available, and having high transmission of light during open state.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al and Kurtz et al, and further in view of Suzuki (US 2002/0089621).

Regarding claim 11, Paukshto et al lacks disclosure of the transmission axis of the front O-type polarizer is parallel to the alignment direction of the front alignment layer, and the transmission axis of the rear 0-type polarizer is parallel to the alignment direction of the rear alignment layer.

Suzuki discloses the transmission axis of the front polarizer is parallel to the alignment direction of the front alignment layer, and the transmission axis of the rear polarizer is parallel to the alignment direction of the rear alignment layer, [par. 0021], for the benefit of having high contrast in liquid crystal display, [see paragraph 0027]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the transmission axis of the front polarizer is parallel to the alignment direction of the front alignment layer, and the transmission axis of the rear polarizer is parallel to the alignment direction of the rear alignment layer for the benefit of having high contrast in liquid crystal display.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al, and further in view of Lazarev et al "E-type Polarizers and Retarders."

Regarding claim 15, Paukshto et al lacks disclosure of wherein the internal polarizer has at least one of the functions selected from the group consisting of an alignment layer, color correction filter, retarder, and any combination thereof.

It would have been obvious to one ordinary skill in the art at the time the invention was made to have the internal polarizer has at least one of the functions selected from the group consisting of an alignment layer, color correction filter, retarder, and any combination thereof, as evidenced by Lazarev et al, ["Introduction" – 3rd par.], for having multi-function from 1 layer, and therefore it would be possible to reduce the weight of the total device.

Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al, further in view of Kaneko (US 2002/0145689).

Regarding claims 16-18, Paukshto et al lacks disclosure of the liquid crystal display further comprises a reflective layer, wherein the reflective layer is semitransparent; and a backlight system.

Kaneko discloses the liquid crystal display further comprises a reflective layer, wherein the reflective layer is semitransparent (9 and 30); and a backlight system (16), [fig. 1], as for the well known benefit of using the liquid crystal display as a transflective liquid crystal display to save power and improve brightness. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use semitransparent reflective layer, and a backlight system in liquid crystal display for the benefit of saving power and improving brightness.

Regarding claim 20, Paukshto et al lacks of disclosing the liquid crystal display further comprises a light-scattering layer.

Kaneko discloses the liquid crystal display further comprises a light-scattering layer (15), [fig. 4], as for the well know benefit of improving high contrast and brightness. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have light-scattering layer in liquid crystal for the benefit of improving high contrast and brightness.

Regarding claims 19 and 21, the language regarding the use as an antireflection layer or the retarder layer is an intended use limitation, and therefore does not patentably distinguish the invention.

Response to Arguments

Applicant's arguments with respect to claims 1-5 and 7-23 have been considered but are moot in view of the new ground(s) of rejection.

Applicants' argument: On page 8 of the Remarks, "Paukshto does not disclose an off-normal viewing direction in the range of an azimuth angle of from 15° to 35°. The method of using (should have been "method of making" – emphasis added) a display by coinciding the direction of the liquid crystal directors with an off-normal viewing direction in the range of an azimuth angle of from 15° to 35° is neither inherent in the disclosure of Paukshto nor obvious from Paukshto in view of Ignatov an further in view of Suzuki."

Examiner's answer: In the previous (and current) rejection, Paukshto does not explicitly disclose the direction of the liquid crystal coincides with an off-normal viewing direction in the range of an azimuth angle of from 15° to 35° in the voltage-on state and the contrast becomes the largest in such a direction. However, the previous (and current) rejection has stated Paukshto's device would have achieved the features/results (such as: the direction of liquid crystal directors coinciding with an off-normal viewing direction of liquid crystal display at the mid-point of the rotational twist when a voltage is applied to the liquid crystal layer by selecting the alignment, material and thickness of the liquid crystal layer whereby a maximum image contrast is achieved in the off-normal viewing direction, wherein the direction of the liquid crystal directors coincides with the off-normal viewing direction is in the range of 15° to 35° in azimuth angle in the voltage-on state and the contrast ratio becomes the largest in such a direction) since the reference by Paukshto has met the structure of the current invention.

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 7,190,416.

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to (Nancy) Thanh-Nhan P. Nguyen whose telephone number is 571-272-1673. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

(Nancy) Thanh-Nhan P Nguyen
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TN

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